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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/578,096	12/22/2006	Kai Zhang	MNA-002	4758

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EXAMINER	
SAIDHA, TEKCHAND	
ART UNIT	PAPER NUMBER
1652	

MAIL DATE	DELIVERY MODE
06/06/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/578,096	ZHANG, KAI	
	Examiner	Art Unit	
	Tekchand Saidha	1652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 May 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/3/06 & 1/23/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The Group and/or Art Unit location of your application in the PTO has changed. To aid in correlating any papers for this application, all further correspondence regarding this application should be directed to Group Art Unit 1652.

2. Preliminary Amendment filed 2/16/207 is acknowledged. Claims 1-12 are pending and under consideration in this examination.

3. ***Priority***

Acknowledgment is made of applicants' claim for priority based on an application filed in Japan on 5.26.2004.

4. ***Drawings***

Drawings filed on 5/3/2006 is acknowledged.

5. ***Specification***

The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

6. Claim 2 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 2 depends from claim 1 and recites the limitation " wherein the inoculated photosynthetic micro alga containing the xanthophyll is an encysted photosynthetic micro alga", which limitation is already present in claim 1 and is therefore not further limiting.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4, 6 & 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4, line 2 recites the phrase 'a low nutrient medium'; claim 6 recites the phrase 'different media' and claim 7 recites the phrase 'light irradiation'. The claims are indefinite because it is not clear about the metes and bounds encompassed by the phrases are unclear, and the specification does not clarify the meaning. It is not clear which are the low nutrient media, different media, and 'light irradiation' means exposure to 'low light' or is it 'irradiation' by exposure to X-rays or γ-rays. Clarification and/or appropriate amendment to the claims is requested.

8. ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Hata et al. [Journal of Applied Phycology (2001), 13(5), 395-402].

Claim 1 is drawn to a method for producing a xanthophyll from a photosynthetic micro alga, comprising: a growth step of inoculating a photosynthetic micro alga containing a xanthophyll into a nutrient medium to grow the photosynthetic micro alga; and an encystment step of encysting the grown micro alga; claim 2 is not further limiting; Claims 3-7 add limitation of carrying the growth and encystment steps being performed in various non-specific media and batch cultures and claims 9-12 add the limitation of the alga genus and species name and the xanthophyll to be astaxanthin and the photosynthetic micro alga having a zoospore containing a xanthophyll.

Hata et al. teach a method for the Production of astaxanthin (a xanthophyll) by sequential heterotrophic- photoautotrophic cultivation of a green alga, *Haematococcus pluvialis*, a photosynthetic micro alga using a growth step in a nutrient medium and encystment step for encysting the micro alga. The method details cultivating of the cells heterotrophically to high cell concentration, followed by illumination (light irradiation) of the culture for astaxanthin accumulation. The optimum pH and temperature for heterotrophic biomass production were 8

and 25 °C, resp. A pH stat method was then used for fed-batch heterotrophic culture, using acetate as the organic carbon source. A cell concentration of 7 g L-1 was obtained. Higher cell concentration could not be obtained because the cells changed from vegetative (zoospore, see page 395 column 2, line 9 and abstract) to cyst forms during the heterotrophic cultivation. However, by using repeated fed-batch processes, the cells could be maintained in the vegetative form, leading to more than two times increase in cell number output rate. When the vegetative cells were transferred to photoautotrophic phase, there was a sharp decrease in the cell number and only very few cells encysted and accumulated astaxanthin. On the other hand, when the shift from heterotrophic to photoautotrophic condition was done when most of the cells had encysted, there was still a decrease in cell number but astaxanthin accumulation was very high. The astaxanthin concentration (114 mg L-1) and productivity (4.4 mg L-1 d-1) obtained by this sequential heterotrophic-photoautotrophic cultivation method are very high compared to the data in the literature. The photosynthetic micro alga having a zoospore (vegetative form) containing a xanthophyll, is considered merely a stage in the micro algal growth cycle, wherein the encysted micro algae releases zoospores and is no different than the zoospore stage taught by the reference. The reference anticipates the claims.

9. ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-11 are provisionally rejected under the judicially created doctrine of double patenting over claims 5-14 of copending Application No. 11/270,116 This is a provisional double patenting rejection since the conflicting claims have not yet been patented.

The subject matter claimed in the instant application is fully disclosed in the referenced copending application and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter, as follows:

The claims in the copending application are drawn to species claims - directed to a method for producing astaxanthin, comprising: cultivating an encysted green alga in a nutrient medium while supplying carbon dioxide and providing irradiation with light at a photosynthetically active photon flux input of 8000 ~mol'photon/m3/s or more; extracting an oil component that contains astaxanthin; and recovering astaxanthin from the extracted oil component that 15 contains astaxanthin, as compared to the broad genus claims in the instant application. Since species claims anticipates genus claims, the instantly claimed genus claims are anticipated by the species claims of the copending application.

10. No claim is allowed.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tekchand Saidha whose telephone number is (571) 272 0940. The examiner can normally be reached on 8.30 am - 5.00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nashaat Nashed can be reached on (571) 272 0934. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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